Ecological Studies on the Sessile Algae of Five Rivers and a Lake in Japan

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The previous studies on sessile algae in fresh-waters were mostly those of the floral research. Some ecological studies have been carried out by Butcher (1932–'47), Kann (1933–'59), Backhaus (1967–'68) and others. However, in these studies were made neither the comparison of the algal flora between river and lake, nor the experimental research on the growth rate of the sessile algae.

The present article deals with the results of the author's investigation from 1968 to 1972 on the specific composition and the standing crops of sessile algae in five rivers (Goh-gawa, Hii-gawa, Kando-gawa, Takatsu-gawa in Shimane-Prefecture and Kuzuryu-gawa in Fukui-Prefecture) and a lake (Lake Biwa in Shiga-Prefecture, the largest lake in Japan).

The succession of the algal vegetation from the upper stream to the lower one, the difference of the vegetation according to the types of river-bed, the seasonal change of the flora and the growth rate of sessile algae, the comparison of the flora among five rivers, the comparison of the flora between river and lake etc. were studied.

The standing crop was measured by the packed cell volume of algae per 25 cm^2 and the dominance was shown in 3 degrees defined by frequency and size. The algal samples were collected from the river-beds of 3 types, namely rapid, subrapid and pool.

The rivers surveyed show in most stations 6–15 ppm Cl' ion and 5–10 mg/l $KMnO_4$-consumption, being therefore in oligotrophic or β-mesosaprobic conditions.

The river flora mainly consists of diatoms and blue-green algae. As a dominant species of blue-green algae, *Homoeothrix janthina* is very

widely distributed. Out of diatoms, *Synedra rumpens var. fragilarioides, Synedra ulna, Cymbella tumida* and *Cymbella turgidula var. nipponica* are widely found. No significant difference in the flora is noticed among 3 river-bed types. Some definite species often dominantly appear in rapid and subrapid, but not in pool.

The standing crops are 0.4~1.0 cc in rapids or subrapids and 0.1~0.3 cc in pools. However, those of rapids are generally higher than those of subrapids. Any large difference in both the flora and the standing crop are not found among the rivers examined.

In Lake Biwa, the sessile algae on the submerged phanerogams were collected at Shimo-sakamoto in Otsu City. Many of the dominant diatoms in the lake are common with those in the rivers, for instance *Synedra rumpens var. fragilarioides, Cymbella turgidula var. nipponica* etc.

The flora and the standing crop in rivers do not change seasonally.

The growth curve of the algal population in the rivers is sigmoidal. The growth rate slows down after about 2 weeks and is leveled after about 3 weeks. In the growth rate and the height of the level attained at saturation a little difference is found among the rivers surveyed, this matter perhaps depends on the productivity of each river.

The growth rate of the sessile algae is not so high in Lake Biwa as in the rivers examined. This difference may be ascribed to the difference between the running waters and the static waters.